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LISTS OF SPECIES

Mollusks from two estuarine areas in Ceará State, northeastern Brazil, with new state records for four species

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ABSTRACT: We analyzed qualitatively the malacofauna found in the tidal zones of Banco dos Cajuais and Ilha Grande estuarine complex, both in Ceará State, northeastern Brazil. Qualitative data on the malacofauna from Banco dos Cajuais and the Ilha Grande estuarine complex were obtained by systematic sampling in 2008 and 2009 during field activities for the "Migratory Shorebirds Conservation and Shrimp Farming in Northeast Brazil" project. Twenty-two species of mollusks (13 bivalves and 9 gastropods) were found in Banco dos Cajuais, and 25 species (18 bivalves and 7 gastropods) were found in the Ilha Grande estuarine complex. Four species, *Lucina muricata* (Spengler, 1798), *Tagelus divisus* (Lightfoot, 1786), *Crassinella martinicensis* (d'Orbigny, 1853), and *Periploma ovata* Kuroda and Horikoshi, 1958 were recorded from Ceará for the first time.

INTRODUCTION

Biological diversity is a key point of conservation biology, and one of the main initiatives for conservation includes an inventory of living organisms in a determined area (Amaral and Jablonski 2005). Knowledge of the diversity of marine benthic invertebrates in Brazil remains unsatisfactory, with a need for many further studies of this fauna along the Brazilian coast.

One of the greatest contributors to knowledge of the marine mollusks in northeastern Brazil was Prof. Dr. Henry Ramos Matthews. By means of his researches in scientific collections, participation in faunal inventories along the Brazilian coast, and private projects, he was able to catalogue many species, both new and known (Matthews and Rios 1967a, b; 1969; 1974). Besides the studies conducted by Matthews and Rios during the 1960s and 1970s, other surveys along the coast of Ceará State in northeastern Brazil have inventoried marine invertebrates (*e.g.,* PROBIO, *Biota Marinha da Costa Oeste do Ceará*; and ZEE, *Zoneamento Ecológico Econômico da Zona Costeira do Estado do Ceará*) (Matthews-Cascon *et al.* 2005; Rocha-Barreira *et al.* 2005; Matthews-Cascon and Lotufo 2006). Ceará has a shoreline of 573 km, with many different formations including sand dunes, cliffs, coastal lagoons, mangroves, sandy beaches, and beaches with rock formations and/or beach rocks (Smith and Morais 1984; Campos and Polette 2003). In spite of continuous studies, this great diversity of habitats makes it impossible to achieve a rapid inventory of the marine mollusks.

In order to contribute to knowledge of Brazil's biodiversity, especially in the northeastern region, the present study analyzed qualitatively the malacofauna in the tidal zones of the Banco dos Cajuais and the Ilha Grande estuarine complex, both in Ceará. Both areas may become part of Federal Conservation Units, currently in the process of creation by the Brazilian government.

MATERIALS AND METHODS

Study sites

Banco dos Cajuais (04º41'00" S, 37°21'00" W) (Figure 1) is located in Icapuí, on the extreme east coast of Ceará. The area covers proximally 540 ha and is 6 km wide. Banco dos Cajuais is part of the Barra Grande estuarine system, with a channel that flows through a tidal delta that may reach up to 3 km wide at low tide. In this area, low tide reveals extensive sand/mud banks, the largest tide flat in the state (Carlos *et al.* 2010).

FIGURE 1. Map showing the location of the study areas (Ilha Grande estuarine complex and Banco dos Cajuais) within the Ceará State, northeast Brazil.

Ilha Grande (02°56'00" S, 41°17'00" W) (Figure 1) is located in the estuarine complex of the Timonha and Ubatuda rivers in western Ceará. With an area of approximately 3,000 ha, this region has one of the best-conserved mangrove areas in northeastern Brazil (Carlos *et al*. 2010).

Data Collection

The qualitative data on the malacofauna from Banco dos Cajuais and Ilha Grande estuarine complex were obtained by systematic sampling in 2008 and 2009 during field activities for the "Migratory Shorebirds Conservation and Shrimp Farming in Northeast Brazil" project. Systematic sampling was conducted in September and November 2008 and February, April, May, and July 2009 at Banco dos Cajuais; and in September and November 2008 and January, March, July, and August 2009 at the Ilha Grande estuarine complex. In each study area, two sampling sites were chosen in the intertidal zone (Cajuais 1, 04°41'25" S, 37°20'50" W, under greater influence of the tidal delta; Cajuais 2, 04°41'35" S, 37°20'07" W; Ilha Grande 1, 02°56'25" S, 41°17'50" W, an area closer to the Timonha River; Ilha Grande 2, 02°56'35" S, 41°18'01" W).

Substrate samples from the intertidal zone were taken to inventory the malacofauna. At each site, three transects of 500 m were established, parallel to the shoreline and 50 m apart from each other. Along each transect, sediment samples were collected with the aid of a cylindrical PVC sampler (corer), 20 cm in diameter and 10 cm high. Samples were taken every 50 m, totaling 30 samples from each site.

The sediment samples were pre-sorted using a sieve with a mesh of 0.5 mm and then stored in labeled plastic bags. The sediment was conserved in 70% ethanol, and the animals were separated under a compound microscope and preserved in 70% ethanol. Mollusks were identified to the lowest possible taxonomic level using appropriate references.

Specimens were collected under official license (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, IBAMA/Sistema de Autorização e Informação em Biodiversidade, SISBIO permit no. 17097-1). All collected material was incorporated into the "Prof. Henry Ramos Matthews - series B" Malacological Collection of the Universidade Federal do Ceará (CMPHRM-B/UFC). The examined material and geographic distribution (based on Rios (2009)) were cited for each species. In the item "Examined material" were included the local, the total number of collected specimen/specimens (spm), as well as the collector (col.) and the date in parentheses.

At the Banco dos Cajuais (Icapuí), besides the sediment samples, a three-hour random search was conducted by two researchers on the tidal delta in order to record occasional species that were not found with the corer. These species were not collected but their presence was recorded by photographs.

Results and Discussion

Sampling conducted in 2008 and 2009 found 22 species in Banco dos Cajuais and 25 species in the Ilha Grande estuarine complex distributed into 25 mollusk families. Some specimens could not be identified to species-level (*Nuculana* sp., *Tellina* sp., *Diplodonta* sp, *Acteocina* sp. and *Haminoea* sp. and Rissoellidae) because they are juveniles or newly metamorphosed larvae.

Class BIVALVIA

Family Nuculanidae

Nuculana sp. (Figure 2.21)

Examined material: Ilha Grande estuarine complex, CMPHRM 3193B, 2 spm, (Rabay col., ix.2008).

Family Mytilidae

Amygdalum dendriticum Megerle von Mühlfeld, 1811 (Figure 2.22)

Examined material: Ilha Grande estuarine complex, CMPHRM 3192B, 1 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: Florida, West Indies, Brazil (Maranhão to Rio Grande do Sul) (Rios 2009).

Family Arcidae

Anadara notabilis (Röding, 1798) (Figure 3.1)

Examined material: Photographic record only.

Distribution: Western Atlantic: North Carolina to Florida, Bermuda, West Indies, Venezuela, Surinam, and the whole of the Brazilian coast (Rios 2009).

Family Ostreidae

Ostrea cristata Born, 1778 (Figure 2.23)

Examined material: Ilha Grande estuarine complex, CMPHRM 3191B, 1 spm, (Rabay col., viii.2009).

Distribution: Western Atlantic: Venezuela, Brazil (Pará to São Paulo; Trindade Island) (Rios 2009).

Family Lucinidae

Lucina pectinata (Gmelin, 1791) (Figure 2.1)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2688B, 1 spm, (Barroso col., iv.2009), CMPHRM 2709B, 1 spm, (Barroso col., xi.2008), CMPHRM 2735B, 2 spm, (Barroso col., ix.2008), Ilha Grande estuarine complex, CMPHRM 3182B, 7 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Venezuela, Surinam, Brazil (Amapá to Santa Catarina) (Rios 2009).

Lucina muricata (Spengler, 1798) (Figure 2.2)

Examined material: Ilha Grande estuarine complex, CMPHRM 3183B, 4 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: Florida Keys, West Indies, Surinam, North Brazil (Amapá to Maranhão) (Rios 2009). New state record: Ceará State (Ilha Grande estuarine complex).

Divaricella quadrisulcata (d'Orbigny, 1846) (Figure 2.3)

Examined material: Ilha Grande estuarine complex, CMPHRM 3181B, 14 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, West Indies, Venezuela, Brazil (Pará to North Rio Grande do Sul) (Rios 2009).

Family Crassatellidae

Crassinella martinicensis (d'Orbigny, 1853) (Figure 2.24)

Examined material: Ilha Grande estuarine complex, CMPHRM 3196B, 2 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: Gulf of Mexico, off Mississippi, West Indies, Brazil (Rio de Janeiro) (Rios 2009). New state record: Ceará State (Ilha Grande estuarine complex).

Family Tellinidae

Macoma constricta (Bruguière, 1792) (Figure 2.7)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2731B, 1 spm, (Barroso col., ix.2008), Ilha Grande estuarine complex, CMPHRM 3185B, 38 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Surinam, Brazil (Pará to Santa Catarina) (Rios 2009).

Strigilla pisiformis (Linnaeus, 1758) (Figure 2.8)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2682B, 2 spm, (Barroso col., i.2009), CMPHRM 2687B, 3 spm, (Barroso col., iv.2009).

Distribution: Western Atlantic: Florida, Bahamas, West Indies, Surinam, Brazil (Ceará to Santa Catarina) (Rios 2009).

Tellina nitens C. B. Adams, 1845 (Figure 2.9)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2677B, 2 spm, (Barroso col., xi.2009), CMPHRM 2733B, 1 spm, (Barroso col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, West Indies, Brazil (Rios 2009).

Tellina punicea Born, 1778 (Figure 2.10)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2697B, 9 spm, (Barroso col., iv.2009), CMPHRM 2736B, 6 spm, (Barroso col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, West Indies, Venezuela, Surinam to Brazil (Fernando de Noronha, Ceará to Santa Catarina) (Rios 2009).

Tellina sp. (Figure 2.11)

Examined material: Ilha Grande estuarine complex, CMPHRM 3186B, 3 spm, (Rabay col., ix.2008).

Family Donacidae

Donax striatus Linnaeus, 1767 (Figure 2.14)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2725B, 1 spm, (Barroso col., vii.2009).

Distribution: Westrn Atlantic: West Indies, Venezuela, Surinam, Brazil (Maranhão to Rio Grande do Norte) (Rios 2009).

Iphigenia brasiliana (Lamarck, 1818) (Figure 2.15)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2680B, 2 spm, (Barroso col., xi.2008), CMPHRM 2700B, 2 spm, (Barroso col., v.2009), CMPHRM 2719B, 1 spm, (Barroso col., vii.2009).

Distribution: Western Atlantic: Florida, West Indies, Surinam, Brazil to Uruguay (Rios 2009).

Family Psammobiidae

Tagelus plebeius (Lightfoot, 1786) (Figure 2.12)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2684B, 1 spm, (Barroso col., i.2009), CMPHRM 2703B, 3 spm, (Barroso col., v.2009), CMPHRM 2711B, 1 spm, (Barroso col., ix.2008), CMPHRM 2718B, 1 spm, (Barroso col., vii.2009), Ilha Grande estuarine complex, CMPHRM 3168B, 1 spm, (Rabay col., iii.2009), CMPHRM 3169B, 1 spm, (Rabay col., xi.2008), CMPHRM 3170B, 9 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Venezuela Surinam, Brazil to Southern Argentina (Rios 2009).

Tagelus divisus (Spengler, 1794) (Figure 2.13)

Examined material: Ilha Grande estuarine complex, CMPHRM 3189B, 3 spm, (Rabay col., viii.2009).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Venezuela, Brazil (Alagoas to Santa Catarina) (Rios 2009). New state record: Ceará State (Ilha Grande estuarine complex).

Family Ungulinidae

Diplodonta sp. (Figure 2.4)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2674B, 4 spm, (Barroso col., xi.2008), CMPHRM 2715B, 1 spm, (Barroso col., vii.2009), CMPHRM 2732B, 2 spm, (Barroso col., ix.2008).

Diplodonta nucleiformis (W. Wagner, 1840) (Figure 2.5)

Examined material: Ilha Grande estuarine complex, CMPHRM 3187B, 6 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, West Indies, Brazil (Rios 2009).

Diplodonta punctata (Say, 1822) (Figure 2.6)

Examined material: Ilha Grande estuarine complex, CMPHRM 3188B, 9 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Bermuda, West Indies, Brazil to Magellanic Region and Chiloe Islands, Chile (Rios 2009).

Family Veneridae

Anomalocardia brasiliana (Gmelin, 1791) (Figure 2.16)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2678B, 5 spm, (Barroso col., xi.2008), CMPHRM 2685B, 27 spm, (Barroso col., i.2009), CMPHRM 2696B, 73 spm, (Barroso col., v.2009), CMPHRM 2706B, 4 spm, (Barroso col., iv.2009), CMPHRM 2708B, 20 spm, (Barroso col., ix.2009), Ilha Grande estuarine complex, CMPHRM 3156B, 21 spm, (Rabay col., xi.2008), CMPHRM 3157B, 28 spm, (Rabay col., viii.2009), CMPHRM 3158B, 18 spm, (Rabay col., i.2009), CMPHRM 3159B, 11 spm, (Rabay col., iii.2009), CMPHRM 3160B, 34 spm, (Rabay col., vii.2009).

Distribution: Western Atlantic: West Indies, Surinam, Brazil to Uruguay (Rios 2009).

Tivela mactroides (Born, 1778) (Figure 2.17)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2705B, 2 spm, (Barroso col., v.2009).

Distribution: Western Atlantic: West Indies, Venezuela, Surinam to Brazil (Pará to Santa Catarina); South Atlantic:

Ascension Island (Rios 2009).

Chione cancellata (Linnaeus, 1767) (Figure 2.18)

Examined material: Ilha Grande estuarine complex, CMPHRM 3184B, 1 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Venezuela, Surinam to Brazil (Amapá to Santa Catarina) (Rios 2009).

Protothaca pectorina (Lamarck, 1818) (Figure 2.19)

Examined material: Ilha Grande estuarine complex, CMPHRM3180B, 1 spm, (Rabay col., viii.2009).

Distribution: Western Atlantic: Caribbean, Surinam to Brazil (Pará to Santa Catarina) (Rios 2009).

Family Myidae

Sphenia antillensis Dall and Simpson, 1901 (Figure 2.25)

Examined material: Ilha Grande estuarine complex, CMPHRM 3190B, 6 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: Texas, Puerto Rico, Surinam, Brazil (Ceará to Santa Catarina) (Rios 2009).

Family Corbulidae

Corbula caribaea d'Orbigny, 1853 (Figure 2.26)

Examined material: Ilha Grande estuarine complex, CMPHRM 3195B, 4 spm, (Rabay col., ix.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, West Indies, Surinam, Brazil, Uruguay, Argentina; Eastern Atlantic: St. Helena Island (Rios 2009).

Family Periplomatidae

Periploma ovata Kuroda and Horikoshi, 1958 (Figure 2.20)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2686B, 1 spm, (Barroso col., iv.2009).

Distribution: Western Atlantic: Brazil (Santos, São Paulo) to Patagonia, Argentina (Rios 2009). New state record: Ceará State (Banco dos Cajuais, Icapuí).

Class GASTROPODA

Family Neritidae

Neritina virginea (Linnaeus, 1758) (Figure 2.27)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2679B, 78 spm, (Barroso col., xi.2008), CMPHRM 2689B, 34 spm, (Barroso col., iv.2009), CMPHRM 2691B, 12 spm, (Barroso col., i.2009), CMPHRM 2698B, 19 spm, (Barroso col., v.2009), CMPHRM 2713B, 15 spm, (Barroso col., ix.2008), Ilha Grande estuarine complex, CMPHRM3162B, 411 spm, (Rabay col., ix.2008), CMPHRM3163B, 125 spm, (Rabay col., i.2009), CMPHRM3164B, 77 spm, (Rabay col., viii.2009), CMPHRM3165B, 110 spm, (Rabay col., xi.2008).

Distribution: Western Atlantic: North Carolina to Florida, Texas, Colombia, Venezuela, Surinam, Brazil (Pará to Santa Catarina) (Rios 2009).

Family Cerithiidae

Cerithium atratum (Born, 1778) (Figure 2.32)

Examined material: Ilha Grande estuarine complex, CMPHRM 3171B, 1 spm, (Rabay col., ix.2008), CMPHRM 3172B, 2 spm, (Rabay col., xi.2008), CMPHRM 3173B, 1 spm, (Rabay col., i.2009), CMPHRM 3174B, 2 spm, (Rabay col., vii.2009).

Distribution: Western Atlantic: North Carolina to Florida, Bahamas, Gulf of Mexico, Texas, West Indies, Colombia, Venezuela and Brazil (Ceará to Santa Catarina; Fernando de Noronha, Martin Vaz Islands and all seamounts). Eastern Atlantic: Sierra Leone to Angola, Africa, Canary Islands (Quaternary) (Rios 2009).

Family Naticidae

Natica marochiensis (Gmelin, 1791) (Figure 2.28)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2704B, 1 spm, (Barroso col., v.2009).

Distribution: Western Atlantic: Florida, West Indies, Surinam, Brazil (Amapá to Espírito Santo; Fernando de Noronha, Trindade and Martin Vaz Islands); Eastern Atlantic: Canary and Cape Verde Islands) (Rios 2009).

Family Nassariidae

Nassarius vibex (Say, 1822) (Figure 2.29)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2721B, 1 spm, (Barroso col., ix.2008), Ilha Grande estuarine complex, CMPHRM 3175B, 4 spm, (Rabay col., xi.2008).

Distribution: Western Atlantic: Massachusetts to Florida, West Indies, Venezuela, Brazil (Pará to Santa Catarina) (Rios 2009).

Family Fasciolariidae

Pleuroploca aurantiaca (Lamarck, 1816) (Figure 3.2)

Examined material: Photographic record only.

Distribution: Western Atlantic: West Indies and Brazil (Amapá to Espírito Santo) (Rios 2009).

Family Turbinellidae

Turbinella laevigata Anton, 1838 (Figure 3.3)

Examined material: Photographic record only.

Distribution: Western Atlantic: Endemic to Brazilian coast (Amapá to Espírito Santo) (Rios 2009).

Family Olividae

Olivella minuta (Link, 1807) (Figure 2.30)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2673B, 19 spm, (Barroso col., xi.2008), CMPHRM 2693B, 14 spm, (Barroso col., iv.2009), CMPHRM 2694B, 26 spm, (Barroso col., i.2009), CMPHRM 2710B, 11 spm, (Barroso col., ix.2008), CMPHRM 2714B, 14 spm, (Barroso col., vii.2009), Ilha Grande estuarine complex, CMPHRM 3178B, 1 spm, (Rabay col., iii.2009), CMPHRM 3179B, 5 spm, (Rabay col., i.2009).

Distribution: Western Atlantic: Texas, West Indies, Colombia, Venezuela, Surinam to Brazil (Ceará to Santa Catarina) (Rios 2009).

Family Rissoellidae

Genus, species undetermined (Figure 2.31)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 2743B, 1 spm, (Barroso col., i.2009).

Family Pleurobranchidae

Pleurobranchaea inconspicua Bergh, 1897 (Figure

3.5)

Examined material: Banco dos Cajuais, Icapuí, CMPHRM 3083B, 1 spm, (Barroso col., ix.2008).

Distribution: Western Atlantic: N. Carolina, Georgia, Florida, Texas, Mexico, Surinam, Brazil (Ceará to Rio Grande do Sul), Argentina (Rios 2009).

Figure 2. Species of Mollusca collected in Banco dos Cajuais and Ilha Grande estuarine complex, Ceará State, northeast Brazil. **1.** *Lucina pectinata*, **2.** *Lucina muricata*, **3.** *Divaricella quadrisulcata*, **4.** *Diplodonta* sp., **5.** *Diplodonta nucleiformis*, **6.** *Diplodonta punctata*, **7.** *Macoma constricta*, **8.** *Strigilla pisiformis*, **9.** *Tellina nitens*, **10.** *Tellina punicea*, **11.** *Tellina* sp., **12.** *Tagelus plebeius*, **13.** *Tagelus divisus*, **14.** *Donax striatus*, **15.** *Iphigenia brasiliana*, **16.** *Anomalocardia brasiliana*, **17.** *Tivela mactroides*, **18.** *Chione cancellata*, **19.** *Protothaca pectorina*, **20.** *Periploma ovata*, **21.** *Nuculana* sp., **22.** *Amygdalum dendriticum*, **23.** *Ostrea cristata*, **24.** *Crassinella martinicensis*, **25.** *Sphenia antillensis*, **26.** *Corbula caribaea*, **27.** *Neritina virginea*, **28.** *Natica marochiensis*, **29.** *Nassarius vibex*, **30.** *Olivella minuta*, **31.** Rissoellidae, genus, species undetermined, **32.** *Cerithium atratum*, **33.** *Acteocina* sp., **34.** *Bulla striata*, **35.** *Haminoea* sp.. Scale bars = 1 mm.

Family Bullidae

Bulla striata Bruguière, 1792 (Figure 2.34)

Examined material: Ilha Grande estuarine complex, CMPHRM 3177B, 1 spm, (Rabay col., vii.2009).

Distribution: Western Atlantic: North Carolina to Texas, West Indies, Venezuela, the whole of the Brazilian coast to Uruguay. Eastern Atlantic: St. Helena Island; Portugal, Morocco. Mediterranean (Rios 2009).

Family Cylichnidae

Acteocina sp. (Figure 2.33)

Examined material: Ilha Grande estuarine complex, CMPHRM 3194B, 1 spm, (Rabay col., ix.2008).

Family Haminoeidae

Haminoea sp. (Figure 2.35)

Examined material: Ilha Grande estuarine complex, CMPHRM 3176B, 6 spm, (Rabay col., viii.2009).

Family Aplysiidae

Aplysia dactylomela Rang, 1828 (Figure 3.4)

Examined material: Photographic record only.

Distribution: Western Atlantic: Bermuda, Florida, Texas, Mexico, Belize, Costa Rica, Panama, Curaçao, Cayman Islands, Jamaica, Puerto Rico, Virgin Islands, Barbados, Venezuela, Brazil (Ceará to São Paulo) (Rios 2009).

Although the intertidal zone in this region has been well studied, four species were recorded from Ceará for the first time (*Lucina muricata*, *Tagelus divisus*, *Periploma ovata* and *Crassinella martinicensis*). This study extends the range of *Lucina muricata* south by about 567 km and extends the range of *Periploma ovata* north by about 2500 km.Gaps in geographical range of *Tagelus divisus* and *Crassinella martinicensis* are also filled.

All species found in this study were expected, since they are commonly found in estuarine and coastal systems of Brazil (Rios, 2009). At the same time the present study represents a significant contribution to the knowledge of gastropods and bivalves mollusks on the coast of Ceará State, since the Banco dos Cajuais and Ilha Grande estuarine complex were unexplored areas.

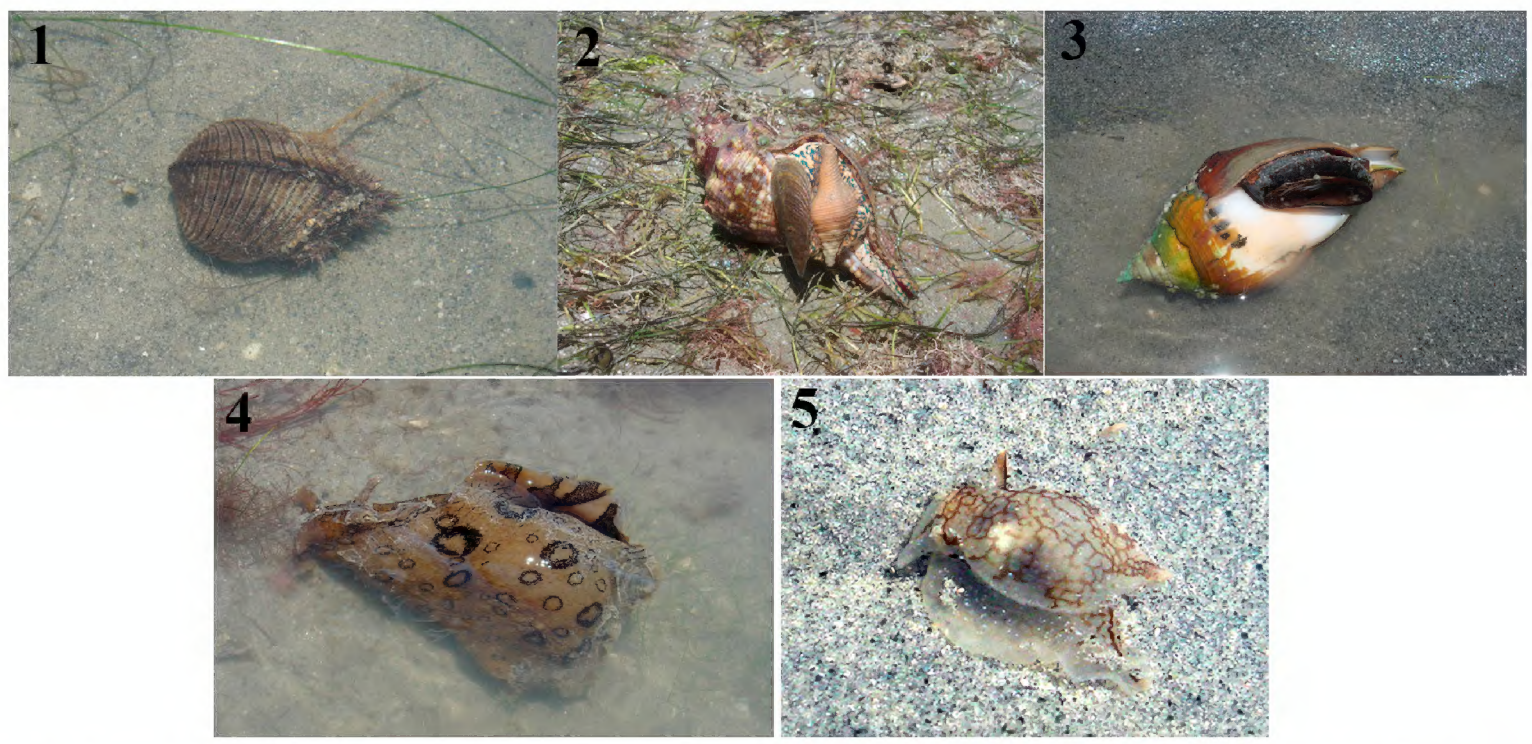

Figure 3. Species of Mollusca photographed in Banco dos Cajuais, Ceará State, northeast Brazil. **1.** *Anadara notabilis*, **2.** *Pleuroploca aurantiaca*, **3.** *Turbinella laevigata*, **4.** *Aplysia dactylomela*, **5.** *Pleurobranchaea inconspicua*.

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